

MEMO

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TO Mike Radel, [REDACTED]

FROM Ralph Morrison

DATE [REDACTED]-02

REGARDING Flow Verification Meeting Notes

The following is a list of my notes taken from our [REDACTED]-02 meeting. Please review and comment. The equipment described below is made up of an oval gear flow meter and an associated controller.

- Controller to be configured in a NEMA 4X enclosure and have the ability to accept up to 4 oval gear inputs. Hardware to be configured to accept 1,2, or 4 inputs from gear meters.
- Controller operates by controlling pump rate based on input value and/or flow input value.
- Sample gear meter input and update display (also 4-20 mA output) every 30sec. to 30 min. – programmable.
- Accept “Make-Up Flow” based on 4-20mA input and/or accept “Blow Down Flow” based on 4-20mA input. Control can be based on either signal- programmable.
- 4-20 mA output for each pump rate.
- Programmable alarm setpoint for each pump rate.
- Alarm output contact (mechanical relay) for each alarm set-point.
- Use most cost effective display
- Datalogging of flow inputs as well as pump rates (include totalizer)
- The controller display should have the ability to toggle between 5 screens as follows:
 1. System Screen: display value for “Make-Up Flow” based on 4-20mA input, display value for “Blow Down Flow” based on 4-20mA input, display value for “Cycles” based on math function of two inputs. Flow Rate to be scaled from input. Display dosage rate in PPM.
 2. Pump #1 Screen: display input value for feed rate, display actual feed rate based on gear meter reading. Display to read in GPH, GPD, or mL/H or mL/M.

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- 3. Pump #2 Screen: display input value for feed rate, display actual feed rate based on gear meter reading. Display to read in GPH, GPD, mL/H or mL/M.
- 4. Pump #3 Screen: display input value for feed rate, display actual feed rate based on gear meter reading. Display to read in GPH, GPD, or mL/H or mL/M.
- 5. Pump #4 Screen: display input value for feed rate, display actual feed rate based on gear meter reading. Display to read in GPH, GPD, or mL/H or mL/M.
- Set-up screen(s) will need the following input values:
 1. Pump Tag Names/Numbers
 2. Passcode for feed rates
 3. pump draw down
 4. alarm set point
 5. % allowable deviation (measured vs. setpoint)
 6. set sample rate
 7. set control type: Make Up Flow, Blow Down Flow, or Manual input. MU or BD flow control will require PPM Dosage Rate Input.
 8. Pump Rate input: Manual input value or PPM based on flow input.
 9. set datalog sample rate